REPORT

OF THE COMMITTEE ON

MATERIALS PLANNING

CONTENTS

				Pages
			Letter of Transmittal	
1.	CHAPTER	I -	Introduction	1 to 6
2.	CHAPTER	II -	Plan for Copper	7 to 16
3.	CHAPTER	III -	Plan for Rubber	17 to 39
4.	CHAPTER	IV -	Principles & Procedures of Material Planning	49 to 50
5.	CHAPTER	V -	Role of the Department of Materials Planning	51 to 59
6.	CHAPTER	VI -	Organisational Arrangements	60 to 64
7.	CHAPTER	VII -	Summary of Conclusions and Recommendations	65 to 71
8.			Annexures	

N.J.Kamath,
Joint Secretary,
(Tech.Development)

GOVERNMENT OF INDIA
MINISTRY OF SUPPLY, TECHNICAL DEVELOPMENT & MATERIALS PLANNING
NORTH BLOCK, NEW DELHI

18th June 1966

No.2851-JSK-66

My dear

I have the honour to submit the Report of the Committee on Materials Planning which was constituted on the 11th April 1966. As required in our terms of reference, we have carried out studies on the two selected commodities, namely, Copper and Rubber. Based on these studies, we have attempted to indicate certain broad guidelines that may be followed in working out the principles and priorities of allocation of scarce materials. We have also spelt out the role of the Department in some detail and indicated the broad pattern of the organisation that may be set up to discharge the functions of material planning.

2. An important development which took place as the Committee's work was nearing its completion was the devaluation of the rupee. As it is too early to know the full effects of devaluation, we have not attempted to evaluate its implications on the demand and consumption pattern of the commodities studied.

3. As import liberalisation is a measure likely to be given effect in in the near future, we have given thought to the question whether it would in any way minimise the need for a separate Department of Materials Planning. Our examination has left us in no doubt that the Materials Planning Department has an important role to play on a continuing and permanent basis.

4. We found the time allowed for the completion of our task too short for a study of this nature and magnitude. At the same time, it has been indeed a very challenging task which involved the unfolding of a comparatively new concept. If I may add a personal note here, in this challenging task, it has been my proud privilege to have with me a team of members everyone of whom worked untiringly towards the building up of this Report.

5. The Committee would feel that its efforts have been more than amply rewarded if the Report would assist the Government in organising the task of Materials Planning for which a new Department has been created, in such a way as would enable it to achieve the objectives in view.

Yours sincerely,

(N.J.Kamath)

Shri K.Ram,
Secretary,
Department of Supply, Tech.Development and Materials Planning,
NEW DELHI.

CHAPTER [illegible] INTRODUCTORY

1. THE PROBLEM

The ensuring of supply of essential raw materials to industrial units to enable them to contribute their full share to our country's economic development has been a question engaging Government's attention increasingly. In recent months, this problem has been acutely felt, particularly in respect of those essential raw materials as have to be largely imported or are otherwise scarce. The principal difficulty in securing the necessary supply of these scarce raw materials has been the lack or shortage of foreign exchange and uncertainty about its availability in adequate measure during any given period. In respect of some materials, there has also been a growing world shortage of supply in relation to the demand. There has thus been an imperative need for building up an efficient system of materials planning.

2. DEPARTMENT OF MATERIALS PLANNING

To meet this requirement Government of India created a Department of Materials Planning as an integral part of the Ministry of Supply, Technical Development and Materials Planning under the Presidential Order dated the 25th March, 1966. The newly constituted Department has been assigned the following functions :-

1) Coordinated assessment of demands for raw materials by sectors, industries and large units, in relation to particular groups of products and to available capacities.

2) Assessment of domestic availability of raw materials with due regard to the feasibility of import substitution.

3) Assessment of requirements of imports of raw materials, with due allowance for inventories.

4) Determination of principles, priorities and procedures for allocation of raw materials.

5) Any other matters connected with materials planning.

3. CONSTITUTION OF A COMMITTEE

To work out the manner in which materials planning could be undertaken by the newly constituted Department and for the purpose of carrying out a pilot study concerning the requirements, availability and appropriate utilisation of certain critically scarce materials, a Committee on Materials Planning was constituted on the 1[illegible]th April, 1966. The composition of the Committee as it emerged is as follows :-

1.	Shri N.J.Kamath, Joint Secretary, Technical Development & Materials Planning, Ministry of S.T.D.& M.P.	CHAIRMAN
2.	Dr. A.Seetharamiah, Industrial Adviser, Dte. General of Technical Development	Member
3.	Shri N.Krishnaswami, Industrial Adviser, Dte. General of Technical Development	Member
4.	Shri Hari Bhushan, Director (Engineering) Planning Commission	Member

5.	Shri M. Satyapal, Director (Chemicals) Planning Commission	Member
6.	Shri P. S. Gupta, Management Group of the Committee on Plan Projects, Planning Commission	Member
7.	Mr. Richard E. Schmidt, Management Group of the Committee on Plan Projects, Planning Commission	Member
8.	Shri K. K. Sarin, Joint Director, Perspective Planning Division, Planning Commission	Member
9.	Shri D. Mazumdar, Director, Office of the Development Commissioner, Small Scale Industries	Member
10.	Shri C. J. Shah, Industrial Adviser, Dte. General of Technical Development & Officer on Special Duty (Materials Planning).	Member-Secretar

4. TERMS OF REFERENCE

The Committee was required to carry out a study in terms of the functions assigned to the Department of Materials Planning in the Presidential Order cited, as far as certain critical raw materials are concerned. To begin with, the study would be confined to two specific commodities, namely, Copper and Rubber. This study would be of a pilot nature, with the specific objective of bringing together information concerning the requirements, availability, appropriate allocation and use of the two critical raw materials, so that the manner in which the work of materials planning should be undertaken could be properly assessed and appropriate planning and allocation procedures could be evolved. The Committee was also required, in the light of experience gained during the study of the two specific commodities named above, to examine whether the present set up in the Ministry of Supply, Technical Development and Materials Planning including the Directorate-General of Technical Development would be adequate for effectively discharging the functions assigned to the Department of Materials Planning or whether any organisational changes would be necessary for the achievement of this objective.

5. PROCEDURE FOLLOWED BY THE COMMITTEE

As per the above terms of reference, we made a pilot study on copper and rubber, drawing substantially from the information available with the D.G.T.D., the Office of the Development Commissioner, Small Scale Industries and the Planning Commission. As we have been asked to submit our report within a period of not exceeding 2 months, the study has been confined to the present position of the two commodities, viz. their likely demand, indigenous availability and import requirements for the period upto 1960-71 without going into the long-term aspects covering a 10 or 15 year period which could be left to be taken up by the regular Department of Materials Planning. We also invited representatives of the following Associations

सत्यमेव जयते

for giving us their views and suggestions, either orally or in writing :-

1)	Indian Non-ferrous Metal Manufacturers' Association, Calcutta.	Copper
2)	Federation of Associations of Small Industries of India, Delhi.	
3)	Association of Rubber Manufacturers in India, Calcutta.	Rubber
4)	Indian Rubber Industries Association, Bombay.	

The views and suggestions received from these bodies have been given full consideration while working out the estimates relating to the demand and indigenous availability as also in drawing up the principles, priorities and procedures for distribution of the materials studied. Including the sittings at which these representatives were met, we held in all 4 meetings.

6. ASSUMPTIONS

While estimating the demand, indigenous availability and import requirements, we have made the following broad assumptions :-

a) The demand estimates have been based on the tentative targets indicated in the Fourth Plan for the several industries consuming the raw materials. If targets get revised in the Fourth Plan as would ultimately emerge, the demand estimates will also have to be modified accordingly.

b) To the extent practicable, the end-use criterion has been adopted in estimating the demand for the raw materials without regard to the question whether the user-unit is in the small scale or organised sector or whether it is in the public or private sector.

c) The over-riding assumption has been that the need for some sort of selective control on distribution of imported items, such as copper and rubber, would continue so long as the shortage of foreign exchange persists.

d) As it would be too early to correctly assess the full effects of devaluation, no attempt has been made to apply any corrections to the rupee value of the foreign exchange costs involved. The rupee requirements indicated in the report, are, therefore, based on exchange rates effective prior to devaluation.

7. ARRANGEMENT OF THE REPORT

A chapter each has been devoted to the studies conducted on copper and rubber. Based on these studies, as also on a general review of the present system of allocation of critical raw materials, we have discussed the general principles and made certain recommendations in the succeeding chapter. Another chapter has been devoted to the role of the Materials Planning Department. In the penultimate chapter, we have made certain recommendations regarding the organisational arrangements that would be necessary at the initial stages. The report concludes with the final chapter on summary of our recommendations and conclusions.

CHAPTER II - PLAN FOR COPPER

COPPER AND ITS IMPORTANCE

Copper, in its pure or alloyed form, is a material of considerable importance to the national economy. It is of vital use in electrical industries as also in several non-electrical industries, such as, heat transfer equipment, bearing material, non-ferrous castings, industrial and durable consumer goods including kitchen utensils and coinage. In its alloyed form, it is a vital ingredient in the traditional handicrafts which, besides being potential foreign exchange earners, provide large scale employment to artisans all over the country.

2. ASSESSMENT OF DEMAND

Forecasts of demand for copper, the indigenous availability, and the gap to be met by imports, during the Fourth Plan period, have been made by different bodies, like the Development Council for Non-ferrous Metals and Alloys, the Working Group on Non-ferrous Metals, the Group on Maintenance Imports and the Perspective Planning Division of the Planning Commission. These assessments except for the one made by the Perspective Planning Division, were made at a time when copper was more easily available and prices were much lower than presently prevailing. During the last 3 years, the prices have been sky-rocketing and even at these high prices it has been difficult to procure supplies of copper. The known and proved deposits of copper ore in the country are also far too inadequate to hold out any hopes of meeting the domestic demands to any appreciable extent. In this context, the drive for import substitution has gained considerable momentum during the last 2 or 3 years. To cite a few instances, the switch-over from the use of copper to aluminium is progressively implemented in the field of electrical conductors, cables, PVC and VIR wires, flexibl wires and so on. The other examples would be in the field of bronze bearings for railway axle boxes and castings in the machine tool and automobile industries. Bearing all these recent developments in mind, we have worked out and arrived at our own estimate of demand for copper which is indicated in the table below in juxtaposition to the estimates of demand made by the different bodies cite

Table : I Estimate of Demand (In thousand tonne

Year	Development Council for Non-ferrous metals.	Working Group on Non-ferrous industries.	Working Group on Maintenance Imports (Jul.65)	Perspective Planning Division, Planning Commission (Mar.1966)	Committe on Mater Planning
1965-66		*137.80	120.00	94.00	95.00
1966-67			140.00	115.00	120.00
1967-68			160.00	135.00	139.00
1968-69			189.00	155.00	157.00
1969-70			200.00	175.00	174.70
1970-71	238.00	+235.50	220.00	200.00	192.50

* Calendar Year 1965

+ Calendar Year 1970

3. BASIS FOR ASSESSMENT OF DEMAND

In arriving at the above estimates of demand, we have taken into account the norms of consumption as applicable at present in respect of the major industries using copper. The norms and the estimated requirements of copper based on these norms are set out in Annexure I. The estimates of requirements of copper in the electrical industries for the years 1965-66 and 1970-71 are indicated in Annexures II and III and for non-electrical industries in Annexure IV. The overall estimates of requirements are indicated in the table below :

Table II Overall estimate of Requirements ('000 Tonnes)

	1965-66	1970-71
A. Total of Electrical Industries	36.0	70.8
B. Total for non-Electrical Industries	41.1	90.6
C. Misc. including Defence requirements (10% A & B)	7.7	16.10
D. Consumption all industries	84.8	177.90
E. Addition to the production reserves of consumers @ 8% of additional consumption over the last year	6.7	12.00
F. Requirements for repairs maintenance etc. (2% of D)	1.8	3.00
Grand Total	93.3	192.50
or say	95.0	

The requirements for the intermediate years indicated in Table I, i.e. for the first four years of the Fourth Plan period, have been arrived at by interpolating figures on the basis of a uniform increase in demand during each year of the period.

4. AVAILABILITY OF COPPER

The availability of copper can be conveniently studied under three heads :

a) Domestic Production :

As regards domestic production, currently, there is only one unit producing copper, viz. the Indian Copper Corporation Ltd. Ghatsila, whose smelter capacity is of the order of 10,000 tonnes. The production for the years 1961-62 to 1965-66 has been, on an average 9,500 tonnes per annum. The I.C.C. expect to expand their production to 12,500 tonnes depending on their ore arisings. Thus 12,500 tonnes is the maximum limit for production of copper by the I.C.C. by 1970-71. The Khetri Copper Project in Rajasthan with a capacity planned at 21,000 tonnes per annum is as yet under implementation. The proposal to add another 10,000 tonnes to its capacity through the exploitation of Kolihan copper ore is still at a very early stage and it would be too optimistic to place the production at Khetri at any figure beyond 21,000 tonnes by 1970-71.

b) Scrap Arisings :

A certain amount of scrap is generated while processing semis into finished goods or components which is generally termed as 'process scrap'. Another type of scrap which comes to the market and is available for use by the industry ~~do~~ due to scrapping of worn out components, equipment, utensils, etc. It is difficult to estimate precisely the total arisings of either of these types of scrap which may become available to the industry. On a broad judgment, we have assumed scrap arisings at about 10% of the previous year's consumption for adding to the resources under domestic availability.

(c) Imports :-

Imports of copper during the years 1961-62 to 1963-64 ranged between 65,000 to 69,000 tonnes per annum, and dropped down to about 53,000 tonnes in 1964-65. The fact that the quantity of copper imported during the first 3 or 4 years of the Third Plan have remained roughly at the same level despite a substantial increase in the growth of industries using copper, would clearly establish that substitution of copper is achieving practical results. Despite these efforts the disturbing factor, however, has been that the price of copper in the world market has increased from Rs.3,100 per tonne C.I.F. in 1961-62 to Rs.5,800 in 1965-66.

6. EMERGING PICTURE OF IMPORT REQUIREMENTS

The estimated import requirement of copper have necessarily to be viewed in the context not only of the demand and domestic availability but also with due regard to the price factor. The picture that emerges for the years 1966-67 to 1970-71 from the foregoing analysis may be briefly summarised as in the table below :-

Table III. Demand, Availability & Imports (in thousand tonnes)

Year	Total demand	Indigenous availability		Import requirement	Value of imports in crores of Rs. at Rs.5,800 per tonne.
		Domestic production	Scrap arisings.		
1966-67	120.50	10.0	9.5	101.00	59.00
1967-68	139.00	12.5	12.0	114.50	66.50
1968-69	157.00	17.0	14.0	126.00	73.00
1969-70	174.70	25.0	15.7	134.00	78.00
1970-71	192.50	35.0	17.5	140.00	81.00
Total	783.70	99.5	68.7	615.50	357.50

NB: The foreign exchange requirements have been computed on the price of Rs.5,800/- c.i.f. per tonne as adopted by the Perspective Planning Division, Planning Commission. The above does not take into consideration recent devaluation of Rupee.

सत्यमेव जयते

6. 6. COPPER CONTROL

Imported copper has been under statutory control since April 1958. Upto the 13th September, 1965, the control was operated under the Non-Ferrous Metal Control Order. During this period, foreign exchange for import of copper was being allocated by the Department of Economic Affairs, Ministry of Finance, to the following agencies :-

Defence,
Railways,
Other Government Departmental works,
Public Sector Projects,
DGTD for scheduled units borne on their list
Development Commissioner, Small Scale Industries for small scale units.
Established importers.

D.G.S.&D. used to arrange for the purchase and import of copper required by the Defence, Railways, P & T. Workshops, Mint etc. The requirements of public sector projects were met through direct imports by them. The factories on the list of DGTD arranged the import of their copper requirements directly after obtaining actual users licences, and by linkage through established importers. As for small scale units, their requirements were bulked and imported by the S.T.C. up to 30th November 1963 and thereafter by M.M.T.C. for distribution as per allocations made by the State Directorate of Industries in consultation with the Development Commissioner, Small Scale Industries. The copper imported by established importers was ear-marked for supply to scheduled units in the books of DGTD. Upto 13th September, 1965, there was neither price nor distribution control on indigenous copper produced by the I.C.C.

The Scarce Industrial Materials Control Order was issued on 14th September, 1965, and under this Order not only imported copper but also indigenous copper came under control. Further more, as per the Import Policy announced for the current year 1966-67, the import of copper is canalised through the M.M.T.C. The said Order has since been rescinded.

PLANNING FOR THE IMPORT OF COPPER

The efforts so far made for the procurement of copper have only been on a short-term basis. Over the last few years, India had switched over to the import of copper mainly from the US AID sources. Soon after the out-break of hostilities between India and Pakistan in September, 1965, the United States withdrew this facility. Other alternative sources of supply did not add up to much and this has resulted in serious dislocation of industrial production. Combined with this has been the fact that the LME prices of copper in the international markets have been escalating steeply. From a price of £363 per ton FOB in 1963-64, the LME price recently touched £790 per ton FOB, and even at this price copper was not readily available. As a result, much more foreign exchange has to be spent for the import of relatively smaller quantities of copper than would have been required if only we had concluded long-term arrangements with the producers whose prices were in the neighbourhood of £230 per ton FOB some years ago. Not only has the producers price itself mounted upto £496, per ton FOB, but also owing to their having committed their entire production to others, we are not in a position to get any copper from the producers directly even at this increased price of £496 per ton FOB. A clear inference would be that the efforts made upto now, which have been of a short-term nature, have proved costly in-as-much as we are required to spend more foreign exchange for less quantity of copper.

सत्यमेव जयते

In the light of the above findings, we are of the view that it should be a matter of policy for the Government to indicate foreign exchange availability for the import of copper well in advance, so that M.M.T.C. or other Central Agency is placed in a position to finalise forward contracts for the copper required over a reasonably long-term period, say 4 to 5 years. We realise that it would be impracticable in our present foreign exchange situation to cover the entire import requirements of copper under such a long-term arrangement; furthermore, it is not unlikely that the demand estimate may undergo certain changes as the Plan makes progress. Also, it would be advisable to leave scope for import of copper under other forms of assistance. In these circumstances, and also in the context that the demand under heavy electrical industries would be for about 40,000 tonnes, to which should be added a further 10,000 tonnes to meet the priority requirements of Defence and other another 50,000 tonnes for other priority and capital goods industries, we are of the considered view that free foreign exchange should be made available to a Central agency like the M.M.T.C. for entering into long-term commitments for the Fourth Plan period in respect of at least 50% of the estimated requirements of imported copper as spelt out by us in paragraph 6 above.

8. PRIORITIES IN THE ALLOCATION OF COPPER

Broadly speaking, priorities in the industrial sector today are usually accorded to Defence and Defence-oriented industries, Railways and P&T requirements, Public utilities and export oriented industries. In preference, however, to attempting a system of priorities in terms of sectors like Defence and non-Defence, public and private, and large scale and small scale, we have found it appropriate to recommend that allocation should be based on the end-use of the material in the context of the requirements of national economy. The only proviso we would add is that the intrinsic importance of end-product could not be the sole criterion as other considerations like export-orientation and requirements of traditional industries which keep a vast population at a reasonable level of employment would tilt the balance in favour of certain industries. We, however, do not propose to straightaway draw up any exhaustive list of priorities based on end-use or other relevant considerations but would recommend that these functions be legitimately left to be attended to by the Department of Materials Planning. It would be the responsibility of that Department to evolve a rational system of allocation based on considerations having a bearing on the growth of the economy.

सत्यमेव जयते

Once the priorities are worked out, a higher percentage of allocation will be made to industries with greater priority and progressively lower percentage of allocation to industries with lower priorities.

CHAPTER III - PLAN FOR RUBBER

1. RUBBER AND ITS IMPORTANCE

Rubber is one of the strategic materials required for the maintenance and growth of the economy both in peace time and during a national emergency. It forms the basic raw material for the manufacture of tyres and tubes for trucks, buses, cars, aeroplanes, bicycles, tractors and earth-moving equipment, rubber items used in industries such as conveyor and transmission belting, miscellaneous automobile components, rubber and canvas footwear, rubber hoses for agricultural and oil industry, contraceptives and medicinal bottle-caps and a host of other miscellaneous rubber goods. During World War II, when supplies of natural rubber flowing into U.S.A. dried up, the U.S.Government had to go in for production of synthetic rubber on a commercial scale. Natural rubber continues to be included in the list of items for stock-piling in USA and other countries in view of its strategic importance. The world production of natural and synthetic rubber has risen from 2.5 million tons in 1954 to a level of over 5 million tons in 1964.

सत्यमेव जयते

2. GROWTH OF INDUSTRIES CONSUMING RUBBER:

Over the last decade, there has been a phenomenal growth in the industries consuming rubber in this country. With the expansion of road transport, the production of automobile tyres has increased from 8.85 lakh Nos. during 1954 to 25.91 lakh Nos, during 1965, and that of bicycle tyres from 5.23 million to 18.15 million. The present production of rubber and canvas footwear in the large scale sector alone is at the level [illegible] million pairs, as compared to 31 million 1954. As an instance of the increase in the production of rubber products used in industry, we may cite the increase in the production of "V" and fan belts from a mere 0.6 million to 3.5 million Nos. in 1965. The ex-factory value of production of rubber goods is estimated at Rs.130 crores during 1965. As a result of expansion of the rubber goods industry, the country is now nearly self-sufficient in respect of all important items based on rubber. Imports of finished rubber goods have declined to a negligible level. On the other hand, there have been exports of tyres, tubes, footwear, hoses, etc. which touched the figure of Rs.1.33 crores in 1963-64 and Rs.2.46 crores in 1964-65. The exports of rubber goods are expected to reach a new high of Rs.4 crores during 1966-67.

3. ASSESSMENT OF DEMAND

a) Method of assessment :-

End-use analysis is the basis on which the demand for rubber is estimated. For this purpose, projections are made of the growth in the production of rubber consuming industries and demand for rubber is estimated by adopting certain coefficients of rubber consumption per unit of production of the major items. It has been found that about 70 per cent of the consumption of rubber goes into the production of automobile and bicycle tyres and tubes and tyre retreading material (camel-back). This will be seen from the break-up of pattern of consumption by the units on the DGTD list in 1964 as in the table below

Table IV Consumption Pattern in 1964

Name of product	Consumption of all types of rubber - 1964 (Tonnes) by the DGTD units.	% consumption in 74,000 tonnes.
1. Automobile tyres and tubes	36,800	49.7
2. Bicycle tyres & tubes	11,000	14.9
3. Camel Back (tyre retreading material)	3,900	5.3
4. Rubber, Canvas footwear	9,800	13.2
5. Rubberised fabric and hospital sheeting	1,000	1.3
6. Latex Foam	950	1.3
7. V, Fan & Conveyor belts	1,400	1.9
8. Hoses, automobile rubber components, etc.	5,000	7.0
9. Other Misc. rubber goods	4,150	5.4
	74,000*	100.0

* This is exclusive of consumption by the smaller units (not on DGTD list) which was about 9,000 tons. This goes in mostly for the manufacture of miscellaneous rubber goods and to a limited extent for the manufacture of hoses, footwear, latex foam and tyre retreading material.

The method adopted, therefore, is to make a detailed analysis of the trends and estimates of production of automobile and bicycle tyres and tubes on the basis of the growth of automobile and bicycle production and then extrapolate in the ratio of 30:70 the rubber requirements for other industries vis-a-vis the estimates arrived at for the tyre and tube industries. In practice, it has been found that the overall demand estimate for rubber arrived at by this method has been fairly reliable.

b) Agencies making assessments of demand:-

Demand projections for rubber are made both by the industry and by the Government. The Rubber Board, which is vitally interested in the trends of consumption and demand for rubber makes its own estimate of demand while the two rubber goods manufacturing associations also attempt their own forecast of the growth of demand for rubber. These estimates become available to the DGTD who also take into account the data regarding production capacity, pattern of usage of various types of rubber, past consumption and available stocks of rubber and arrive at the estimate of demand. In the matter of long term estimates, studies are made by Ad-hoc Working Groups set up by the Planning Commission with which representatives of DGTD and other Departments of Government concerned and representatives of industry are also associated.

c) Demand estimates for 1964-65, 1965-66 and 1970-71 :-

The Working Group on Chemicals had estimated the rubber requirements based on certain tentative targets of production of rubber goods industries at about 220,000 tonnes in 1970-71. These estimates, however, require modifications in the light of subsequent changes in the various targets that had been assumed by the Working Group. We have, therefore, prepared a revised estimate of rubber requirements for the Fourth Plan period in the light of the current tentative targets under consideration for inclusion in the Fourth Plan. Placing reliance on the 70:30 basis, we have first estimated the requirement of rubber for the tyre and tube industries and then extrapolated figures for other rubber goods industries in order to arrive at the total requirements of rubber.

i) Automobile tyres and tubes :-

The demand for tyres and tubes can be assessed under two heads viz. under original equipment for fitment on new vehicles and under requirements for replacement purposes for vehicles already on road. Over-all demand can be arrived at by adding to these the Government purchases and the requirements for inventories and exports.

The demand for tyres and tubes for original equipment is related to the programme of development envisaged for the automobile industry and is worked out at the rate of 7 sets for buses and trucks, 5 for cars, station-wagons and jeeps, 4 for tractors, 3 for scooters and 2 for motorcycles. On the basis of the production envisaged for different types of vehicles at 3.3 lakh numbers by 1970-71 the tyre and tube requirements would be 1.5 million numbers as indicated in the table below :-

Table V Requirements of tyres & tubes (Original equipment)

Vehicle	Production for 1965 - 66 (Nos.)	Provisional output envisaged for 4th Plan (1970-71)* (Nos.)	No. of tyres required for each vehicle.	Total requirements of tyres by 1970-71 (Nos.)
1. Buses & trucks	35,301	100,000	7	700,000
2. Cars, Taxi cabs, Station-wagons & Jeeps	35,435	70,000	5	350,000
3. Motor-cycles & scooters	47,399	120,000	2.5	300,000
4. Tractors	5,714	40,000	4	160,000
	123,849	330,000		1,510,000 or say 1,500,000

* Latest estimates of the Planning Commission

सत्यमेव जयते

Assessment of demand for replacement purposes is determined after taking into consideration the number of each category of vehicles on road at the beginning of the year and the net replacement rate of tyres for each category of vehicles. Ministry of Transport compiles data on vehicles registered in each of the States; information is thus available regarding the number of vehicles on road at the beginning of 1964-65. The number of vehicles on road by the end of the year is computed by taking into consideration the number of vehicles scrapped and the new vehicles added during the year. Certain norms regarding the average life for each category of vehicles have been adopted in due consultation with the Department concerned. Starting from this base and on the basis of the production target for the Fourth Plan period for each category of vehicles, it is possible to arrive at the vehicle population on road at the beginning of each year of the Fourth Plan. Year-wise figures in respect of buses and trucks and the broad position by 1970-71 in respect of other vehicles is given in the table below :

Table VI Vehicle Population

A. Buses and Trucks - Average life 15 years

Year	No. of vehicles on road at the beginning of the year (000 Nos.)	Old vehicles scrapped during the year (000 Nos.)	Estimated production during the year (000 Nos)	Vehicles on road at the end of the year (000 No
1964-65	921 291	9	37	319
1965-66	319	9	35	345
1966-67	345	10	40	375
1967-68	375	14	50	411
1968-69	411	16	60	455
1969-70	455	15	90	530
1970-71	530	17	100	613

B. Other Vehicles

Name of the Vehicle	No. of vehicles on road at the beginning of the year 1964-65 (000 Nos.)	Average life of the vehicles	Provisional output 1970-71 (000Nos)	No. of vehicles on the road at the beginning of 1970-71 (000Nos.)	No. of vehicles on the road at the end of 1970-71 (000Nos)
1. Cars, taxi, station-wagons & jeeps.	390	15 yrs.	70	617	677
2. Motor-cycles & scooters	166	10 yrs.	120	557	659
3. Tractors and Misc. vehicles	51	15 yrs.	40	135	173

सत्यमेव जयते

Replacement demand for tyres and tubes varies with each category of vehicles. In consultation with the various interests concerned, the D.G.T.D. had worked out certain replacement rate for each category of vehicles as will be seen adopted in the publication "Programmes of Industrial Development 1961-65" issued by the Planning Commission. Considering that there has been a very welcome trend towards a rapid increase in retreading of tyres and also in the light of an analysis of the consumption of tyres during the past three years in the replacement market, we have made an attempt to bring the replacement rates up-to-date and are giving in the table below our estimates of tyres and tubes required for replacement under various categories of vehicles by 1970-71 :

Table VII **Requirements of Tyres & Tubes (Replacement)**

Vehicles	No. of vehicles on road at the beginning of 1970-71 (000 Nos.)	Replacement rates.	Rate of re-tread	Net replacement	Net tyre replacement (000Nos.)
1. Buses & Trucks	530	6.0	33-1/3%	4.0	2,120
2. Cars, Taxi, station-wagons and Jeeps	617	2.0	40%	1.2	740
3. Motor-cycles & scooters	557	1.01	40%	0.6	334.2
4. Tractors and Misc. vehicles	135	2.5	10%	2.3	310.5
	Total Demand				3,505.1 or say 3,500.0

Adding to these requirements the Government Purchase and requirements for inventory and exports, the total annual requirement of tyres and tubes by 1970-71 is expected to be of the order of 6 million Nos. as detailed below :-

a) Tyres required for original equipment	..	1,500,000 Nos.
b) Tyres for replacement purposes	..	3,500,000 Nos.
c) Govt. purchases, other types of tyres and inventories	..	500,000 Nos.
d) Export requirements	..	500,000 Nos.
		6,000,000 Nos.
		6 Million Nos.

सत्यमेव जयते

ii) Bicycle tyres and tubes:

The demand for bicycle tyres and tubes also is also assessed on the basis of demand for original equipment and the demand for replacement purposes plus export requirements. It has been assumed that the demand for bicycles will increase from 1.6 million nos. in 1965-66 to about 2.4 million nos. by 1970-71. Assuming that the average life of a bicycle is 10 years and taking into consideration the new bicycles that would be progressively added less old bicycles scrapped during each of the Plan years, it has been assessed that the number of bicycles on road by 1970-71 would be 15 million numbers. Computing the average tyre replacement for a vehicle in a year at 1.5 nos. the demand for bicycle tyres by 1970-71 would be as under :

Original equipment @ 2 nos. per bicycle i.e. 2,400,000 x 2 ..	4,800,000
Replacement @ 1.5 tyres/bicycle for 15 million bicycles ..	22,500,000
	27,300,000
Export @ 10%	2,730,000
	30,030,000 or say 30 million Nos.

The demand for bicycle tubes may also be placed at 30 million nos. by 1970-71.

iii) Tyre retreading material (Camel back)

The demand for tyre retreading material which is an important item used in repairing worn out tyres and bringing them back into service would also be related to the demand for tyres. The production of camel back in the country which was of the order of 5.9 million Kg. during 1961-62 has gone upto 8.4 million Kg. during in 1965-66. Based on these figures, the demand for this item by 1970-71 may be expected to go up to 15 million Kg.

iv) Rubber demand for tyres and tubes and camel back:

Based on the above demand estimates for tyres and tubes and adopting certain norms regarding the average weight and the proportion of rubber that is used alongg with the various raw materials and chemicals such as, tyre fabric, carbon black, sulphur, etc. in the manufacture of tyres and tubes, we have assessed the demand for rubber for these industries as in the table below:

Table VIII: Rubber Demand - Tyres, Tubes, Camel Back.

Rubber consuming product	Production (000 Nos)	Consumption of rubber Tonne/ 000 Nos.	Requirement of rubber (000 Tonnes)
1. Passenger tyres	2000	6	12
2. Passenger tubes	2000	1.4	2.8
3. Other tyres	4000	19	76
4. Other tubes	4000	2.8	11.2
5. Bicycle tyres	30000	0.4	12
6. Bicycle Tubes	30000	0.14	4.2
7. Camel back	15*	0.6+	9
Total			127.2

* Thousand tonnes + Tonne per tonne

v) Other rubber goods :

A very large number of rubber goods other than tyres and tubes and retreading material account for nearly 30% of the total rubber consumed in the country. In view of the complexity involved in assessing the rubber demand for each of these several items, we have taken into consideration the consumption of rubber for other types of rubber goods excluding tyres, tubes and re-treading material for the years 1956, 1961 and 1966 as in the table below and by a process of projection arrived at the rubber demand for other types of rubber goods at 55,000 tonnes by 1970-71 :

Table IX : Rubber Demand

Year	Total consumption of all types of rubber (tonnes)	Consumption for other rubber goods excluding tyres, tubes and retreading material (tonnes)
1956	35,220	14,400
1961	63,848	27,550
1966	94,835	36,400
1970-71*	1,82,000*	55,000*

* Projected Demand.

vi) Total year-wise requirements of rubber upto 1970-71

From the foregoing analysis, the estimated year-wise break-up of production of more important items during the 4th Plan period will emerge as in the table below :-

Table X : Annual Production of Rubber Goods

Item	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
Automobile tyres and tubes (Mil.Nos. each)	2.38*	2.59*	2.8	3.0	4.0	5.0	6.0
Bicycle tyres and tubes (Mil.Nos. each)	16.33*	18.10*	20.0	22.0	25.0	27.0	30.0
Tyre retreading material (Camel back) (Mill.Kg.)	6.55	8.43	10.0	11.0	12.0	13.0	15.0
All other rubber goods (thousands of tons of rubber consumed)	32.00	36.2	39.0	42.5	46.0	50.0	55.0

सत्यमेव जयते

* Information given is for production of automobile and bicycle tyres only during 1964-65 and 1965-66. Production of automobile and bicycle tubes during the same period was :

	1964-65	1965-66
	(Million Numbers)	
Automobile tubes	2.46	2.64
Bicycle tubes	15.22	19.25

Based on the above figures of production of the more important rubber goods, the year-wise requirements of all types of rubber during the 4th Plan period prefixed with the figures for the last two years of the 3rd Plan are given in the table below :-

Table XI : Annual requirements of Rubber (Thousand tonnes)

Item	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
Automobile tyres and tubes	40.6	43.0	46.0	94.0	68.0	85.0	102.0
Bicycle tyres & tubes	9.0	10.4	11.0	12.0	14.0	15.0	16.0
Tyre retreading material camel back	4.1	5.2	6.0	6.5	7.0	8.0	9.0
All other rubber goods	32.0	36.2	39.0	42.5	46.0	50.0	55.0
Inventory* (additional)	2.0	2.0	2.0	3.0	5.0	6.0	6.0
	87.7	96.8	104.0	118.0	140.0	164.0	188.0

* Inventory - NB:- We have found it necessary to make a provision for the increase in inventory on account of the higher level of consumption of rubber in 1970-71. Taking into account about 3 months stocks, we have placed the requirements on account of the increase in inventories at about 6,000 tonnes in 1970-71 over the level in the previous year.

For eventual utilisation by the Department of Materials Planning, we have found it useful to append at Annexure V, a statement showing the requirements of raw materials for tyres, tubes and other rubber goods manufacturing industry by 1970-71 as also the c.i.f. value, the indigenous capacity already licensed and the additional capacity expected to be licensed. Besides giving the figures for rubber, the statement also gives figures for rayon/nylon yarn cord, carbon black, beadware, accelerators and antioxidants, other chemicals, bicycle tube valves, automobile tube valves and spares.

4. AVAILABILITY OF RUBBER

While the country is self-sufficient in respect of practically all the rubber goods, the supply position of the main raw material, namely rubber, is no where near self-sufficiency. Rubber is a plantation product grown mainly in the Southern State of Kerala and to a smaller extent in the adjoining States of Madras and Mysore. By the end of 1964-65, there was a total of about 383,813 acres under rubber cultivation. The Rubber Board has been taking steps to increase the production of natural rubber by bringing new areas under rubber plantation and by re-planting the existing areas under rubber with high yielding rubber trees. As a result of these and other steps, it has been possible to step up the production of natural rubber from 24,000 tonnes in 1955-56 to about 49,500 tonnes during 1965-66. Steps have also been taken to supplement the supply of natural rubber by setting up a unit in Bareilly for the production of SBR type general purpose synthetic rubber and three units for the production of reclaim rubber. The overall total production of natural, synthetic and reclaim rubber has increased from 24,50 tonnes in 1956-57 to about 71,000 tonnes in 1965-66

Annexure VI gives at a glance the Production, Consumption and Import of rubber each year from 1956-57 to 1965-66.

Inspite of the above steps for increasing the production of rubber in the country, it has not been possible to catch up with the growth in the demand for rubber.

The possibilities of substitution of natural rubber assumes importance in view of the problem of meeting the increasing demand for rubber. The factors which hinder accelerated production of natural rubber are (a) it can be grown only in a limited tropical belt near the equator; and (b) the pressure on agricultural land is steadily on the increase for the production of food and other allied crops.

i) Natural rubber can be substituted to a certain extent by synthetic rubber and reclaim rubber and to a lesser extent by other materials such as plastics. The table below gives the percentage usage of synthetic rubber in different countries of the world :-

Table XII: Synthetic Rubber Usage (Percentages)

	U.S.A.	France	U.K.	Canada	Japan	India	World total
1958	64.5	28.7	26.3	55.7	11.4	8.8	38.5
1959	65.9	33.2	30.3	56.4	16.8	10.9	42.8
1960	69.3	41.6	39.2	61.4	26.8	13.3	46.6
1961	72.1	42.9	42.2	66.4	32.3	15.4	47.4
1962	73.1	46.4	44.0	67.7	35.5	16.7	49.2
1963	74.4	49.9	45.3	69.9	39.5	16.4	51.4

It would be seen that the percentage usage of synthetic rubber in India is very low compared to the usage in any other country listed in the table above. This has been partly because India continues to be one of the few natural rubber producing countries in the world and partly because there was no indigenous production of synthetic rubber till about three years ago. Since the indigenous production of natural rubber is inadequate to meet the increasing demand, there is a clear need to set up additional capacity for suitable types of synthetic rubber based on indigenously available raw materials from the petro-chemical industry. It would be highly desirable to plan for the setting up of more units for the manufacture of synthetic rubber of different types and grades in years to come.

ii) Reclaim rubber is another important material which is being used in very large quantities as a substitute for natural rubber. Three units are already in production for this item in the country. Import of reclaim rubber has been discontinued in the last two years as the country is self-sufficient in respect of this item.

iii) Factice which is prepared by vulcanising non-edible vegetable and fish oils with sulphur or sulphurichloride is another material used as a substitute for natural rubber. It is also called 'Rubber Substitute'. Since its mechanical properties are poor, it cannot be admixed with rubber to an appreciable extent in products such as tyres, belts, etc. but can be used as an extender and as a processing aid in rubber tubing and rubber sheeting and to a large extent in rubber erasers. Two units are in commercial production of this item producing 250 tons per year which adequately meets the demand for this substitute.

iv) As plastics have certain properties of rubber such as water resistance, flexibility, etc., to the extent possible, plastic material is used as a substitute for rubber in certain fields. Examples of the substitution would be the use of PVC in cable insulation, water proofing, footwear, conveyor belts in coal mines, tiles and plastic urethane foam, use of PVC and polyethylene tubes in place of rubber tubing for industrial and agricultural purposes, use of Phenolic plastics such as bakelite in place of hard rubber in electrical fittings. Though the substitution of rubber by plastics is not of a very substantial order, it is considered desirable to pursue it as it would help in conserving the limited supplies of natural rubber.

6. THE DEFICIT IN RUBBER AVAILABILITY

Against the anticipated requirements of the order of 188,000 tonnes of all types of rubber by 1970-71, the domestic availability on the basis of the present programmes of production is estimated to be only of the order of 127,000 tonnes by 1970-71 as per the table below :-

Table XIII Domestic Availability (Tonnes)

	1966-67	1967-68	1968-69	1969-70	1970-71
1. Natural rubber	55,000	59,000	63,000	67,000	72,000
2. SBR Synthetic rubber	17,000	28,000	30,000	30,000	30,000
3. Reclaim rubber	12,000	14,000	17,000	21,000	25,000
	84,000	101,000	110,000	118,000	127,000

7. NEED FOR IMPORTS AND FOREIGN EXCHANGE REQUIREMENTS

The deficit for rubber based on the difference between the demand and the supply position indicated above will naturally have to be met by imports, if growth rate of rubber consuming industries is to be maintained as envisaged in the Fourth Plan. The table below gives the year-wise demand, supply and deficit figures as also the foreign exchange requirements for imports to meet the deficit during the Fourth Plan period.

सत्यमेव जयते

Table XIV : The Deficit and Foreign Exchange Requirements

A. All types of rubber including reclaim rubber

(Tonnes)

	1966-67	1967-68	1968-69	1969-70	1970-71
Demand	104,000	118,000	140,000	164,000	188,000
Supply	84,000	101,000	110,000	118,000	127,000
Deficit	20,000*	17,000	30,000	46,000	61,000

*But for the accident in the synthetic rubber unit, the deficit in 1966-67 would have been only 10,000 tonnes.

B. (a) Break-up of deficit and (b) Foreign Exchange requirements:

	1966-67		1967-68		1968-69		1969-70		1970-71	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Natural. General Purpose Syn. and Butyl rubber	19,200	480	16,000	400	28,800	720	44,600	1,115	59,400	1,485
Special Purpose syn. rubber.	800	48	1,000	60	1,200	72	1,400	84	1,600	96
	20,000	528	17,000	460	30,000	792	46,000	1,199	61,000	1,581

(a) = Deficit in Tonnes

(b)* = Foreign exchange in Lacs of rupees, at about Rs.2500 per tonne c.i.f. for natural, general purpose and butyl rubbers and Rs.6000 per tonne c.i.f. for special purpose synthetic rubber.

It would be seen from the above table that the foreign exchange required for meeting the deficit will be of the order of Rs.5.28 crores during the current year going upto about Rs.16 crores by 1970-71, unless additional capacity for synthetic rubber can be created in the meantime.

8. PRIORITIES IN THE ALLOCATION OF RUBBER

In case it does not become practicable to secure foreign exchange of the order indicated above for the import of rubber, there will be need to allocate on a rational basis the available supplies of all types of rubber among the several rubber consuming industries with a view to ensuring maximum benefit to the economy. It would be useful at this juncture to briefly discuss the distribution system that has been so far in vogue. Currently, there is no control either on the distribution of rubber or its maximum selling price. Imports alone get regulated through the release of foreign exchange. As such under the present arrangement, it is possible to canalise only the imported rubber into desired channels leaving the domestic production free from any manner of distribution control. At a time when the foreign exchange releasewas adequate, the larger units producing the more important items in bulk used to import adequate quantities of natural rubber. There used to be only a limited pressure on indigenously available natural rubber and this had enabled the smaller units producing less important items to purchase rubber locally. As the foreign exchange situation worsened and imports dropped down, the larger units have had to secure their requirements to the extent possible from the local market leading to an increased pressure on the market and to a reduced availability of natural rubber to the smaller units producing less important items. While the type of rubber goods manufactured are many and each one of them is of some importance to the national economy, it is unquestionable that items such as automobile and bicycle tyres and tubes, tyre retreading material, V and fan belts, medicinal rubber products and rubber contraceptives are of a relatively higher priority. Since these items are mainly in the large scale sector, the allocation of foreign exchange for import of rubber to the large scale units has indirectly achieved the objective of channelising available supplies to priority sectors.

If, however, the supply position of rubber worsens as is likely to happen if imports continue to be kept at a low level and additional capacity for synthetic rubber does not get created, then, the present arrangements will not obviously prove adequate. A system of distribution control on both imported and domestic production of rubber would appear to be a logical step under these conditions, but past experience shows that there are several practical difficulties in introducing an extensive distribution control as the number of rubber producers as well as the number of rubber goods manufacturers in the country is very large. We have, therefore, favoured as an alternative to complete distribution control, a system under which a part of the rubber produced in the country, say to the extent of 50 to 60 per cent is procured by Government and is distributed along with such quantities of imported rubber as possible to units manufacturing items of high priority. The needs of the smaller units producing by and large items of lower priority would be left to be met from the balance of rubber available in the market under the normal market operations of price in relation to demand and supply. This would indirectly act as a

सत्यमेव जयते

measure of restriction on the production of items of lower priority while allowing the requirements of rubber for higher priority items to be not substantially.

To sum up, while the existing arrangement seems to be adequate for meeting the present situation, if, however, the availability of foreign exchange and the supply position get worsened, it would, then, be the appropriate function of the Department of Materials Planning to analyse the various factors involved, such as the availability of rubber indigenously, quantum of foreign exchange allocated and the order of priorities of rubber consuming industries at any point of time and make the choice as between the alternative policies that may be followed in regard to the distribution of rubber.

सत्यमेव जयते

CHAPTER IV

PRINCIPLES & PROCEDURES OF MATERIAL PLANNING.

1. From the studies we have conducted on Copper and Rubber, within the time available to us, we have come to certain conclusions regarding the role of the Department of Materials Planning in terms of the functions allocated to it in the Presidential Order and have also given particular thought to the principles, priorities and procedures that may be followed in the allocation function of the Department.

2. THE NEED FOR MATERIAL PLANNING

The need for material planning has been felt for quite some time and even before the Department of Materials Planning was constituted there have been other Departments or Organisations of Government which have been attending to some tasks connected with this function. Various administrative Ministries have been concerned with the determining of requirements of materials and their allocation and ensuring their utilisation in industries looked after by them. The Planning Commission has been looking at the total picture and particularly, the Perspective Planning Division of the Commission has been devoting its attention to demand forecasts from a long term perspective point of view. D.G.T.D. have been concerned with the day-to-day problems of material requirements of and utilisation by industrial units looked after by them and also with demand estimates for the Plan periods. The public sector undertakings have been concerned with problems of materials planning related to their own production and recently the Bureau of Public Enterprises has also been taking interest in this matter. The emergency heightened the problem of scarce materials and led to the constitution of a Sub-committee of Secretaries on Scarce Raw Materials in September 1965. Member (A&T), Planning Commission, expressed the view that the Sub-Committee has been concerned largely with arrangements for importing supplies over a period and has been handicapped for want of whole-time staff support. All these arrangements had evolved over a period of time partly due to historical reasons and partly for Administrative convenience. There have, however, been various difficulties experienced from time to time by the industry due to the inadequacy of these arrangements thereby showing the need for an integrated approach in the matter of procurement and distribution of scarce materials in the over-all interests of the economy. The Lokanathan Committee on the Scarce Industrial Raw Materials and the Mathur Committee on the CCIE and the DGTD have recently drawn attention to the deficiencies in the present system. The somewhat arbitrary allocation of raw material as between small scale and large scale industries, the consideration of material demands of different Ministries in isolation without an over-all view of the total supply and requirements have been indicated as some of the short falls in the present arrangement. In short, at our present stage of economic development, when the demands placed on the economy are more than what can be met by the readily available resources, a fairly comprehensive and fully co-ordinated system of material planning would be a pre-requisite for the achievement of the desired plan objectives and derivation of maximum benefit to the economy from the available resources.

3. ITEMS REQUIRING IMMEDIATE ATTENTION

While a comprehensive system of material planning will be the desired objective to be achieved in due course of time, immediate attention needs to be bestowed on some of the critical items of which adequate supplies are not forthcoming either from the natural resources or from production facilities developed so far in the country. The plan of action would be to select a limited number of key items, and in relation to these, material plans should be organised systematically. As for the choice of the items, while we have attempted in the foregoing chapters to draw a plan for copper and rubber on the basis of the studies that we have been able to conduct in the limited time available to us, other items which would require to be taken up by the Deptt. of Materials Planning could be: zinc, lead, tin, steel and particularly tool, alloy and special steels, mercury, sulphur and rock phosphate. Other critical items in short supply could be taken up later on as the study in relation to the above items makes sufficient headway.

4. THE BASIC PROBLEM

Our examination of the existing position regarding the shortage of critical raw materials has led us inevitably to the original source of the difficulty, namely, the limited foreign exchange resources. With this very real limitation, it is necessary that the primary allocation system viz. that used for the allocation of foreign exchange for the import of raw materials, be designed to allow the maximum utilisation of existing production facilities. The objective then may be stated as follows: Once the national priorities are worked out and the demand for each end product among those ranked high in the national priorities is estimated. and the input requirements of raw materials components are assessed, what is required is to derive the optimum allocation of foreign exchange which will satisfy this demand and ensure that the key sectors which necessarily require these raw materials should be able to obtain them readily without having to go through cumbersome procedures.

5. THE SOLUTION

Obviously the solution is complicated.

(a) The initial choice to be made will be between capital and maintenance imports. In its

Fourth Plan Memorandum, the Planning Commission has underlined the principle of giving first priority to the utilisation of existing capacity, next priority to the expansion of existing capacity and the last priority to the setting up of new units. A number of studies undertaken recently particularly to assess under-utilisation of existing capacity have also emphasised the urgent need for adhering tothese priorities. We would like to reiterate that maintenance imports should receive the first priority and full utilisation of existing capacity should have the first claim on available foreign exchange. The material planning and allocation mechanism must be oriented to achieve this objective.

(b) Within the wide range of maintenance imports, a further choice is available: should it be in favour of virgin material or semi-finished products and components. In the over-all interest of the econom it is clear that basic materials should receive first priority if we are to fully utilise our productive resources.

6. THE GOAL

The Department of Materials Planning must establish the most rational basis for allocation to the consuming industry without regard to the sector i.e. whether public, private, large scale or small scale, the goal being the maximum utilisation of total industrial capacity, in the larger interests of the nation. Failure to do so would lead not only to the non-realisation of the wider production objectives including the building up of an export potential but also to unemployment and distress. To this end, the Materials Planning Department should be able to coordinate and reconcile the demands of individual Ministries, and at the same time, be in a position to assist them and receive full support from them. It should not only look at the problems in the short term but also evolve long term measures and solutions for material problems of industry in their over-all perspective.

7. PRINCIPLES & GUIDELINES

It will be an obvious necessity for the Department of Materials Planning to evolve a set of general principles and priorities to guide their procurement and allocation plans. These principles and priorities will have to be flexible and evolved through experience and experimentation. Contribution to the national economy, saving in foreign exchange, provision of employment, and several other similar objectives -- some of them conflicting with each other -- would naturally have to be taken into consideration. We have given thought to the question of principles and priorities, particularly in relation to the allocation of scarce materials and are suggesting below certain general guidelines that have occurred to us as deserving consideration:-

(a) The allocation of scarce materials should be based on the end-use approach. An industry which is considered to be of high priority at any point of time should receive the same treatment in the allocation of scarce material, whether it is in the large scale or in the small scale sector.

(b) Efficiency-cum-judicious use of material rather than equity should be the prime consideration in the allocation of scarce materials. This is a pre-requisite if it is desired to ensure the maximum benefit to the economy from the limited supplies of scarce materials.

(c) Where more than one scarce material is involved, the allocation would require to be suitably matched so that production is not impaired owing to the absence or short supply of one or the other.

(d) Export-oriented industries should be given due weightage in the matter of allocation of scarce materials.

(e) Where there is a choice between the import of finished product and that of raw material for its production in the country, the latter should obviously find favour in regard to the allocation of foreign exchange.

8. SELECTIVE ALLOCATION OF FOREIGN EXCHANGE

It has come to our notice that at present, virtually all requests for import of raw materials receive like attention, regardless of their magnitude. It is our view that the present system of foreign exchange control and allocation could be modified by employing selective control. An example of selective control wehave in mind would be that used in inventory control where the management concentrates its attention on high value consumption items with little controlon low value inventories. This system of selective control is intended to minimise the cost of control without loosing its effectiveness. Through this arrangement an enormous reduction in paper work and in the size of the control staff is possible. Selective control also focuses attention on matters where it will do the most good. Under this system, the large users would be subject to frequent review and careful control while the smaller users could be left comparatively free from administrative control. It is our view that this wouldbe a more practical approach and would also stimulate production in the small scale unit which have their own role in the national economy.

9. CONTROL ON DISTRIBUTION OF MATERIAL

The type and nature of control on distribution of materials would also vary both in time and in commodities. Direct allocation through an administrative mechanism might be difficult in the case of commodities which are utilised by a large number of users. Elaborate administrative arrangement would not alsobe justified where shortages are of a marginal character or of a temporary nature. In certain commodities it would be possible to ensure their use for priority purposes in preference to their use for less priority items through a judicisous application of fiscal levies without the need for introducing elaborate administrative controls. In the final analysis, the nature of the distribution arrangement and control will have to be decided on the basis of a judgement of the different factors involved such as the degree of scarcity, the extent of administrative burden and the nature of technological factors. In this connection, we would like to recall the alternative arrangements we suggested in our Plan for Rubber': either permit imports to the extent desired to only the manufacturers of priority items or meet their requirements through physical distribution of the raw materials procured by Government to the extent necessary; after meeting such requirements, leave the non-priority sector to compete in the open market for securing their requirements to the extent available.

10. STOCKPILING

We received certain suggestions regarding the need for stockpiling critical raw materials. Stockpiling has been adopted as a method in other countries for a wide range of materials in order to ensure the availability in times of national emergency. While we see the desirability of ensuring availability of critical materials to a sizeable extent, it is doubtful if stockpiling could be accomplished to any sizeable extent in the context of the present foreign exchange situation, and also in materials like copper where there is a world shortage at present. However, there might be an advantage in selective stockpiling to a limited extent. The Department of Materials Planning might initiate special studies in this respect to determine the costs involved and the economic benefits that would accrue in maintaining limited buffer stocks of critical raw materials particularly those required in smaller quantities, to ensure continuity of their supply in the event of an emergency.

11. LONG-TERM COMMITMENT

While we recognise the inherent difficulties in committing free foreign exchange for total requirements over a long period, we are nonetheless convinced that there is considerable merit in entering into long-term procurement contracts for a certain percentage of the country's requirements for scarce raw materials particularly in respect of those in which there is a growing world shortage with consequent price increases.

12. ADMINISTRATIVE ARRANGEMENT

The administrative arrangement for the procurement and allocation of materials may vary from commodity to commodity and also from time to time. In respect of the materials for which the country is entirely or largely dependent on imports we are of the view that there will be a definite advantage in organising procurement through a centralised agency. This would enable the procurement of such materials at comparatively favourable prices and at the same time make it administratively easier to control their distribution. There is a further advantage that such procurement through a centralised agency makes it more convenient to enter into long term arrangements on an assured basis.

सत्यमेव जयते

CHAPTER V

ROLE OF THE DEPARTMENT OF MATERIALS PLANNING

1. GENESIS

The requirement for a national materials planning function has been under Government's consideration for quite some time. A proposal for setting up a Materials & Production Board had been mooted as early as in December, 1963, for the over-all planning and for allocation of key items which are in short supply and which constitute critical bottleneck in essential fields. While no Board, as such, was constituted, the Sub-Committee of Secretaries on Scarce Raw-materials to which a reference has been made earlier was set up soon after the conflict with Pakistan and the stoppage of inflow of a substantial portion of foreign aid. This was followed up by the formation of the new Department of Materials Planning. Although it could be said that the idea of forming the Department had been precipitated by the acuteness of the foreign exchange situation, it is clear that the underlying problems of integrated planning and the need for using the scarce raw materials to the best advantage of the economy would continue to present themselves even if the current difficulties get somewhat ameliorated. It is our view that the Department of Materials Planning which has come into existence has a permanent role to play. Firstly, to overcome the present difficulties, especially in critically scarce materials such as copper, the Department has a short term role to play. More important, however, is its long term role under which it has to evolve and maintain a coordinated plan which provides a long range, rationa system for collection and evaluation of information about demand, procurement, allocation, distribution and utilisation of scarce materials, with a view to ensuring an optimum return on the existing and planned investments in the national economy.

2. THE ROLE OF THE DEPARTMENT

The functions assigned to the Department of Materials Planning under the Presidential Order have already been stated in Chapter I. Our analysis has revealed that these could be spelt out as follows:-

(a) Identification of scarce materials.

(b) Assessment of demand, supply and import requirements.

(c) Advice on foreign exchange requirements and allocation.

(d) Procurement planning.

(e) Allocation of materials.

(f) Import substitution.

(g) Conservation of scarce materials.

(h) Forward Planning.

(i) Evaluation.

In all these functions, the role of the Department would be in the nature of a coordinator or adviser, the Department acting more or less as a clearing house in matters relating to materials planning and allocation. The functions are discussed below:-

3. IDENTIFICATION OF SCARCE MATERIALS

Materials Planning cannot be attempted in respect of the entire range of materials required for the economy. To be effective it has necessarily to be confined to such of those materials as are of critical significance to the national economy and are, or are likely to be, in short supply over a period of time. The Department should keep a watch over the demand and supply trends both within the country and abroad so as to be in a position to identify scarce materials in respect of which material planning would be necessary.

4. THE ASSESSMENT FUNCTION

An important pre-condition for materials planning is a correct assessment of the total national demand for scarce materials. For this purpose we recommend that the user Ministries/sponsoring authorities should forward to the Department of Materials Planning their own demand estimates. Based on the data so received and its own scrutiny, the Department would estimate the nett import requirements of the critical materials after taking into account their availability of these materials from domestic production. After the total requirements of critical materials to be imported have been so estimated, the Department should prepare a foreign exchange budget for imports.

5. FUNCTION OF ADVISING ON FOREIGN EXCHANGE REQUIREMENTS AND ALLOCATION

The estimate of foreign exchange requirements so made will then be forwarded by the Department to the Ministry of Finance in the Department of Economic Affairs. This is clearly an advisory function under which the Department recommends to Finance how it could best utilise the limited foreign exchange resources at its disposal for the import of the most advantageous mix of raw material and components. It has to be realised that the ultimate responsibility for allocation of foreign exchange rests with the Ministry of Finance. The Materials Planning Department can, however, render valuable assistance to Finance by providing an objective assessment of the overall needs of the economy.

सत्यमेव जयते

6. PROCUREMENT PLANNING

Once the Department has sent its advice to the Finance Ministry in the Department of Economic Affairs in regard to the allocation of foreign exchange for the import of scarce raw materials and the latter makes the necessary allocation, it would be for central organisations such as the STC and MMTC to attend to the procurement of the material and its subsequent handling including the physical distribution.

While the details of procurement may be attended to by the Centralised Agency, the Department of Materials Planning should, however, watch the timely provisioning of materials through a system of procurement planning from the over-all point of view.

As and when it becomes necessary, it should also be the function of this Deptt. to advise on the procurement and distribution of the indigenously available scarce materials.

7. THE ALLOCATION FUNCTION

It should be the function of the Deptt. of Materials Planning to recommend the allocation of available scarce materials as among the different consuming interests. The Department should evolve rational allocation principles designed to maximise the use of existing production resources and still meet the priority needs of the country. In this function, it would be necessary for the Deptt. to have the full cooperation of the various user Ministries. To the extent supplies are short of the needs of user Ministries/sponsoring authorities, it would be necessary to arrange allocation of the available supplies as per a system of priorities to be evolved. In order to ensure that the allocations ultimately decided upon find acceptance by the user Ministries/sponsoring authorities, it would be necessary to have a high powered body which might be called the Materials Planning and Allocation Board consisting of the representatives of the user Ministries as also the

the Department of Materials Planning and the Planning Commission. To our mind, it would seem a realistic and workable proposition if the Materials Planning and Allocation Board is presided over by the Secretary of the Ministry of Finance, Department of Economic Affairs. It would be the function of the Department of Materials Planning to service this Board and to make appropriate recommendations to it in regard to the allocation of materials.

8. IMPORT SUBSTITUTION

Import substitution is another field in which the Materials Planning Department should act as the coordinator and initiator of specific studies and watch their progress. Currently the subject of import substitution is being dealt with in different Departments like the D.G.T.D., the CSIR, the Planning Commission and even the Department of Economic Affairs. There is a clear need to coordinate action, so that areas of substitut are identified on an overall basis, specific measures of action are devised and propagated and the decisions of Government are followed up.

सत्यमेव जयते

9. THE CONSERVATION FUNCTION.

The Materials Planning Department, we recommend, should also concern itself with measures for the conservation of materials. It will have to initiate action to restrict or moderate the use of such materials as are in short supply or are expected to be in short supply and for which resources have not been adequately built up in the country. These measures should cover not only studies of possibilities of substitution, but also a revision of standards where necessary in order to conserve and minimise the use of scarce materials.

10. THE FORWARD PLANNING FUNCTION

The Department of Materials Planning should guide the other Ministries concerned with major enterprises both in the public and private sector in regard to matter of forward planning of production and procurement of scarce materials. The studies conducted by the Department on the demand and supply of critical materials would highlight the areas of shortages likely to emerge over the long term and would throw light on the kind of operational decisions that would have to be taken in the matter of programmes of substitution and additional production both in the short term and over long periods. As an initiator of action to meet the shortages likely to emerge in the long run, the Department will have an active role to play. This role will include the function of alerting the research institutions like the C.S.I.R. and the Geological Survey of India for undertaking research on the development of substitutes and innovation of new products, initiation of surveys for the discovery of specific minerals, starting up of plantations to meet impending shortage of cellulosic raw materials for timber-based industries or even the preparation of project studies for increasing production to meet anticipated requirements.

11. EVALUATION ROLE

The Department of Materials Planning should conduct periodic follow up evaluations of the utilisation of scarce materials. These studies will be necessary to verify the demand estimates in order to minimise the recurrence of inflated demands. In order to facilitate these studies, the Department must have an efficient information system. It is our view that one of the first tasks which would require to be attended to/by the Department would be the development of a sound information system and the collection and compilation of the necessary data, covering not only the data relating to production and utilisation but also the norms of consumption. We do not consider it necessary that an elaborate reporting system should be built up straightaway. In time as the Department assumes responsibility for a larger variety of materials there may be a requirement for automatic data processing. For the time being, however, the Deptt. can commence its work making use of the existing facilities.

12. GENERAL

In the foregoing paragraphs, we have given an account of the main functions which would require to be attended to by the Department of Materials Planning. We would however, like to add that the above account is not by any means exhaustive. From time to time, need may arise for the Department to attend to other functions, mostly of a coordinating nature. The Department must necessarily have a dynamic approach on problems in its sphere, which would call for not only keeping a lively watch over the current situation but also visualising in advance the likely developments relevant to materials planning in the over-all context, so that appropriate action could be planned and pursued in time.

CHAPTER VI

ORGANISATIONAL ARRANGEMENTS

1. EXISTING SET UP EXAMINED

As required in our terms of reference, we have examined whether the present set up in the Ministry of Supply, Technical Development and Materials Planning would be adequate for effectively discharging the functions that would be required to be attended to by the Department of Materials Planning or whether any organisational changes would be necessary for the achievement of the objective. We are satisfied that for the magnitude of the task involved in the materials planning function, the existing arrangements are not adequate and that there should be a well-knit organisation for attending to it in a continuing and regular manner.

2. RELATIONSHIP WITH OTHER AGENCIES

During the course of our studies, we had come to the conclusion that the functions of the Department of Materials Planning which have been described in Chapter V would primarily be in the nature of compiling, coordinating data and rendering advice to the Government in respect of material planning. The original information inputs would be drawn from existing agencies like DGTD, DC. SSI, Planning Commission, Economic Adviser, Ministry of Industry, and other agencies of Government. In the execution of its plans and programmes, the Department would also be required to operate through the administrative Ministries, sponsoring authorities and public undertakings. It is only proper that the Department should not duplicate the work which is already being done in any of these other organisations. As the DGTD is the main technical adviser to the Government of India and also the repository of a considerable amount of current information in regard to industrial development, it is our view that the Department of Materials Planning should work in close coordination with the DGTD. Therefore, we see merit in having the Department as part of the Ministry which is in overall charge of the DGTD. This will facilitate the ready accessibility to the information, knowledge and expertise available with the DGTD.

3. HEAD OF THE DEPARTMENT

We have examined whether there would be any advantage in having at the head of the Department a fullfledged Secretary to the Government. Both from the point of view of the volume of work involved and from the fact that there would be an advantage in having a common Secretary for the DGTD and the Department of Materials Planning, we are of the considered view that there is no need to place the Department under a separate Secretary.

Since we visualise that a lot of work of the Department will have to be done through the Materials Planning and Allocation Board which has to be serviced by the Department, we see merit in having a Joint Secretary at the head of this Department who will also function as Secretary of the Board. However, for the present, till the work of the Department of Materials Planning gets into full swing, it should be adequate if the Joint Secretary in charge of Technical Development is made concurrently responsible for the work of this Department as well.

4. SUPPORTING STAFF

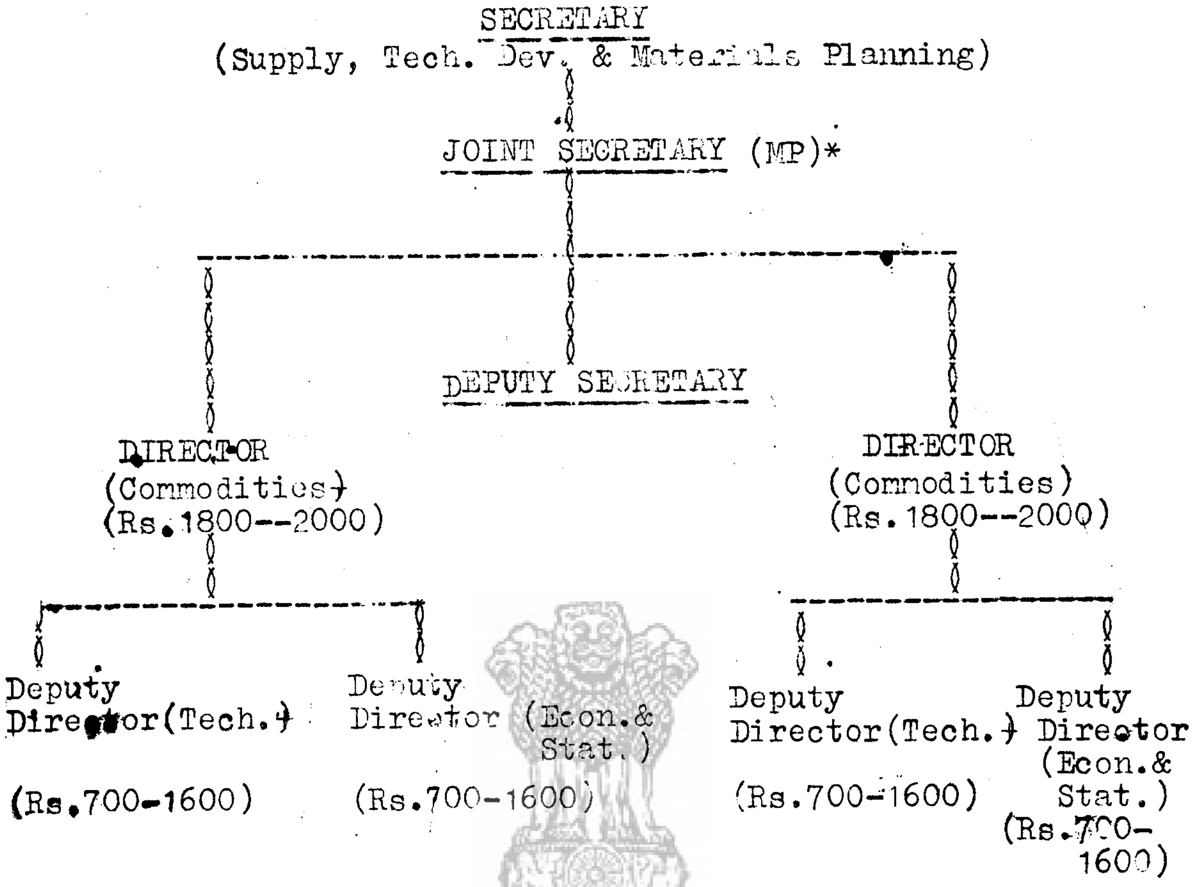
As this Department will be primarily concerned with discharging functions of a technical nature, the supporting organisation should obviously have a technical bias. We have considered possible alternatives for its structure on a functional basis. One way of doing this would be to classify the functions under the following groupings:

A. ECONOMIC & STATISTICAL - Collection, compilation, tabulation, analysis and interpretation of data relating to assessment of demand, indigenous availability, procurement plans, import requirements, price trends etc.

B. TECHNICAL & PROMOTIONAL - Import substitution, conservation, promotion of suitable techniques and standards, technical evaluation of performance.

C. PRIORITIES & ALLOCATION - Foreign exchange budget, determination of priorities, allocation of foreign exchange and materials.

Another way of organising the Department would be to have different Divisions based on commodities taken up for study. Combining these two approaches, we have evolved as shown below, an organisational set up which we feel would answer the immediate requirements:-



* For the present, the work of Joint Secretary (MP) could be concurrently attended to by the Joint Secretary (TD).

The distribution of work between the two Directors will be on the basis of commodities selected for study. The Deputy Directors, however, under each of these Directors will be drawn from two distinct disciplines, one to attend to technical and promotional aspects of work and the other to attend to the economic and statistical aspects of work. The Deputy Secretary will assist the Joint Secretary in coordinating the work between the two Directors and in dealing with the work connected with the Materials Planning and Allocation Board.

We have not attempted to spell out the staff necessary to be attached to Deputy Directors on the one hand and the Deputy Secretary on the other. We envisage that there would be need for suitable assistance by way of Economic and Statistical Investigators/Technical Assistants to be provided to the Deputy Directors and ministerial staff to be attached to the Deputy Secretary. The staffing at this level, however, should be on a modest scale, the details being left to be settled as the work of the Department takes shape.

सत्यमेव जयते

CHAPTER VII

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

A. CONCLUSIONS

1. Overall requirement of copper is estimated at 1,92,500 tonnes by 1970-71 (Chapter II, para 3)

2. Domestic availability of copper and scrap arisings is estimated at 35,000 tonnes and 17,500 tonnes respectively by 1970-71. (Chapter II, para 5).

3. The total import requirements of copper for the year 1970-71 and for the Fourth Plan period are estimated at 140,000 tonnes and 615,500 tonnes respectively.
(Chapter II, para 5)

5 4. Overall requirement of rubber is estimated at 188,000 tonnes by 1970-71 (Chapter III, para 3).

5. Domestic availability of all kinds of rubber is estimated at 127,000 tonnes. (Chapter III para 6).

6. Import requirement of rubber is estimated at 61,000 tonnes by 1970-71. (Chapter III, para 7).

7. A fairly comprehensive and fully coordinated system of material planning will be a pre-requisite for the achievement of the desired plan objectives and derivation of maximum benefit to the economy from the available resources. (Chapter IV, para 2)

8. The functions of the Department of Materials Planning could be spelt out as under :-

a) Identification of scarce materials.

b) Assessment of demand, supply and import requirements.

c) Advice on foreign exchange requirements and allocation.

d) Procurement planning.

e) Allocation of materials.

f) Import substitution.

g) Conservation of scarce materials.

h) Forward planning.

i) Evaluation.

In all these functions the role of the Department would be in the nature of a co-ordinator or adviser. (Chapter V para 2)

B. RECOMMENDATIONS

1. Once the priorities are worked out, a higher percentage of allocation should be made to industries with greater priority and progressively lower percentage of allocation to industries with lower priorities (Chapter II para 8).

2. There is need for an integrated approach in the manner of procurement and distribution of scarce materials in the overall interests of the economy. (Chapter IV para 2).

3. Besides copper and rubber, the Department of Materials Planning should take up the following items for further study :-

> Zinc, lead, tin, steel and particularly tool, alloy & special steel, mercury, sulphur and rock phosphate.
>
> (Chapter IV para 3)

4. The primary allocation system used for the allocation of foreign exchange for the import of raw materials should be designed to allow the maximum utilisation of existing production facilities. (Chapter IV, par. 4).

5. The maintenance imports should receive the first priority and fuller utilisation of existing capacity should have the first claim on the available foreign exchange.

(Chapter IV, para 5).

6. The import of basic materials should receive high priority over the import of semi-finished products and components. (Chapter IV, para 5).

7. The Department of Materials Planning must establish the most rational basis for allocation to the consuming industry without regard to the sector i.e. whether public, private, large-scale or small-scale the goal being the maximum utilisation of total industrial capacity in the larger interest of the nation. (Chapter IV, para 6).

8. The principles and priorities for procurement of and allocation of scarce materials will have to be flixible and evolved through experience and experimentation.

(Chapter IV, para 7).

9. General guide-lines for determining principles and priorities for the allocation of scarce materials may be as follows :-

a) The allocation of scarce materials should be based on the end-use approach. An industry which is considered to be of high priority at any point of time should receive the same treatment in the allocation of scarce material, whether it is in the large scale or in the small scale sector.

b) Efficiency-cum-judicious use of material rather than equity should be the prime consideration in the allocation of scarce materials. This is a pre-requisite if it is desired to ensure the maximum benefit to the economy from the limited supplies of scarce materials.

b) Ef
c) Where more than one scarce material is involved, the allocation would require to be suitably matched so that production is not impaired owing to the absence or short supply of one or the other.

d) Export-oriented industries should be given the due weightage in the matter of allocation of scarce materials.

e) Where there is a choice between the import of finished product and that of raw material for its production in the country, the latter should obviously find favour in regard to the allocation of foreign exchange.

(Chapter IV para 7).

10. The present system of foreign exchange control and allocation should be modified by employing selective control. (Chapter IV, para 8).

11. There might be advantage in selective stockpiling to a limited extent. The Department of Materials Planning might initiate special studies in this respect to determine the cost involved and the economic benefit that would accrue in maintaining limited buffer stocks of critical raw materials particularly those required in smaller quantities. (Chapter IV, para 10).

12. Government should enter into long-term procurement contracts for certain percentage of country's requirements of scarce materials particularly for those items where there is a growing world shortage with consequent price increases. In case of copper, long-term contracts for procurement of at least 50% of the estimated import requirement should be entered into. (Chapter IV, para 11 and Chapter II, para & 7).

13. In respect of materails for which the country is entirely or largely dependant on import, there will be definite advantage in organizing procurement through a centralised agency. (Chapter IV, para 12).

14. The Department of Materials Planning, after assessing the total demand and indigenous availability of the scarce materials should prepare a foreign exchange budget for the import requirements and forward it to the Department of Economic Affairs, Ministry of Finance.

(Chapter V, para 4).

15. A high powered body called the Materials Planning and Allocation Board, consisting of the representatives of the user Ministries, Department of Materials Planning and Planning Commission should be constituted. It may be presided over by the Secretary of the Ministry of Finance, Department of Economic Affairs. This board should be serviced by the Department of Materials Planning and should make allocations to various user Ministries/sponsoring authorities as per system of priorities evolved.

(Chapter V, para 7)

16. The Department of Materials Planning should act as the coordinator and initiator of specific studies for import substitution and conservation of scarce materials and watch their progress.

(Chapter V, paras 8 & 9)

17. The Department of Materials Planning should guide the other Ministries in matters of overall planning, production and procurement of scarce materials.

The Department should also keep close liaison with C.S.I.R (National Research Laboratories), Geological Survey of India, etc. for initiating research programmes for development of substitutes, surveys for discovery of specific minerals, etc.

(Chapter V, para 10)

18. The Department of Materials Planning should conduct periodic follow-up evaluations of the utilisation of scarce materials. (Chapter V, para 11).

19. There is merit in having the Department of Materials Planning as part of the Ministry which is in overall charge of the DGTD. (Chapter VI, para 2)

20. Both from the point of view of volume of work involved and from the fact that there is an advantage in having a common Secretary for the DGTD and the Department of Materials Planning, there is no need to place the Department under a separate Secretary. It would, however, require a Joint Secretary at the head of the Department who will also function as Secretary of the Materials Planning and Allocation Board. For the present, it should be adequate if the Joint Secretary in charge of Technical Development is made concurrently responsible for the work of this Department as well.

(Chapter VI, para 3)

21. The supporting organisation should be staffed on a functional basis with two Directors and 4 Deputy Directors. In addition, there will be a Deputy Secretary who will assist the Joint Secretary in the coordination of the work of the two Directors and the servicing of the

Materials Planning & Allocation Board. The Deputy Directors and the Deputy Secretary will have to be suitably assisted with technical and secretariat staff on a modest scale.

(Chapter VI, para 4)

सत्यमेव जयते

ANNEXURE I

Norms for requirement of copper in electrical and other industries.

1. Motors

i) Upto 150 KW or below capacity

Upto 30 H.P. motors are of aluminium rotors and also because of introduction of class E insulations upto certain capacity the norm is 1.9 Kg. per K.W.

Target = 4.5 million H.P. or 3.4 million K.W.

Total requirement = 6,500 tonne.

ii) Above 150 KW upto 450 KW

Norm is 1 Kg. per K.W. - for Stator Rotor, Slip Ring and end connections.

Target = 1.25 million H.P. or, say, 1 million K.W.

Therefore requirement of copper = 1000 tonnes.

iii) D.C.Machines, small alternators, welding Generators and other miscellaneous machines including of FHP motors = 800 tonnes.

Therefore, total for motor = 6,500 + 1000 + 800
≑ 8,300 tonnes.

2. Transformers

i) Distribution Transformers:

Norms given by Planning Commission is 1.9 KG.per KVA. Since the average size of transformers now being manufactured is larger, the norm previously adopted is reduced to 1.6 Kg. per KVA. Target for 1970-71 in this range is 5.0 million KVA.

Therefore, requirement of copper is ≑ 8000 tonnes.

ii) Power Transformers

Target = 6.8 million KVA

Norm is 1.0 Kg. per KVA

Requirement of copper = 6,800 tonnes.

Total for transformers = 8,000 + 6,800 = 14,800

If substitution from copper to aluminium is smaller ranges upto 600 KVA as envisaged tables place this quantity will be reduced by approximately 1,000 tonnes.

3. SWITCH GEAR & CONTROL GEAR

Norm is 10 Kg. per Rs.1000 of production in value

Target = Rs.400 million.

= 4000 Tons.

4. FANS

Norm = 1 Kg. per fan

Target 3.5 million Nos. by 1970-71

Requirement = 3500 Tons.

5. CABLES

i) PVC & VIR Cables

Target for 1970-71 = 1400 million metres

Out of the above, 20% i.e. 280 million metres will be of copper.

Copper is allowed for the manufacture of only Flexibles, Control Cables, Mining and Trailing Cables, Railway signalling cables. From the pattern of production, the requirement of copper is at 20 Tons per million core metres.

Therefore, requirement = 5600 tons

ii) Bare Copper Conductors & PILC Cables

Bare copper strips for earthing, links, bus bars etc.

Requirement is approximately 2000 tonnes

For PILC Cables, complete change-over from Copper to Aluminium has been effected, and there is no requirement of Copper for Power Cables.

6. Winding Wires for miscellaneous purposes such as Chokes, Radios, Fluorescent Lamps and for re-winding purposes, etc.

Estimated requirement for these miscellaneous appliances is about 6000 tons. Taking into account the measures of substitution by aluminium in certain applications, net requirement is 5000 tons.

7. Refrigerators & Air-conditioners.

Norm = 6 Kg. per Rs.1000 of equipment cost.

Target for 1970-71 = 200,000 Nos. = Rs.2.65 million.

Requirement of Copper = 1600 Tons.

8. Winding Wire and Paper, etc. covered strips.

Requirement of the above are largely included under Motors, transformers, etc. requirement of only about 7,000 tonnes may be assessed for industries not specified.

9. Generators and other rotating machinery

Target of production 1.5 million KW - consumption 5 Kg/KW.

Total requirements = 7,500 tonnes.

10. Hindustan Telephone Cables

Block provision of 7,500 tonnes per year on this basis that the present requirements are about 1,200 tonnes per 3,200 KM of dry core cables. This will be expanded to 8,000 requiring about 5,000 tonnes. The second cable factory will require another about 2,500 tonnes of copper.

11. Automobiles

Gross rolled steel requirement per autmobile (weighted average weight per vehicle for cars, trucks and buses being 2.9 tons for a pattern of production as outlined in the Third Plan) has been taken as 2.9 tons. According to the U.S. census of manufactures (1947) copper and copper based alloys required for the manufacture of 'Motor vehicles and parts' are about 1.9 per cent of that of rolled steel. On this basis the consumption horm for copper for automobiles is taken at 0.05 tons per unit.

12. Locomotives

Non-ferrous castings required in the manufacture of single W.G.Locomotive (broadgauge, heavy duty weighing 128 tons, tractive effort: 38,890 lbs) at Chittaranjan loco works are 3.5 tons per locomotive and that per M.G. loocmotives 3 tonnes.

सत्यमेव जयते

13. Food products machinery:

Consumption of copper was 5.0 percent of steel consumption for the production of food processing Machinery in USA (1947) and this has been taken as the basis in the present calculations.

14. Hardware fittings:

Substantial qualities of copper and its alloys are used for plumbing, sanitary and water fittings and fix tubes for furnitures, doors & windows etc. In USA the consumption of copper and its alloys is around 90% of the rolled steel consumed for these applications.

In view of the shortage of supplies of copper, norm of consumption of copper has been taken as 50% of the copper/steel consumption ratio as prevailing in U.S.A.

15. Pumps & Compressors:

Requirement of rolled steel for pumps and compressors is taken as 30 tons per thousand nos. According to USA census of manufactures (1947) copper to steel requirement ratio for pumps and compressors is 13:100 'norm' of copper requirement for pumps and compressors is therefore taken as 4 tons per thousand numbers.

16. Bolts, nuts, rivets and washers:

Consumption of copper for the manufacture of bolts, nuts, rivets and washers was 2.4 per cent of the rolled steel consumption for this manufacture in USA (1947). A slightly lower consumption at about 2.0 per cent has been assumed as our requirement.

17. Non-ferrous metal alloys, antifriction bearing metal bronze gun metal, solder etc.

सत्यमेव जयते

These alloys are mainly required for the manufacture of railways equipment, bearings etc. They are also used by the defence and Mint for coinage. On an overall basis copper content of above alloys has been assumed 75 per cent of their weight. Small quantities of these alloys are also consumed by some of the industries listed above and as such there is likelihood of some error in these estimates due to duplication. Attempt is being made to study the break-down of the consumption of these alloys by various users.

18. Chemical Industries equipment:

Assuming copper/steel consumption as the same as that for food products machinery, the norm per million Rs. of equipment has been taken at 10 tonnes, as per Russian norm.

19. Diesel engines:

Ad hoc norm of 15 Kg has been assumed per engine.

20. Metal powders for use in chemicals:

The requirements of cuprous and cupricoxides and oxychlorides for use in ceramics, insecticides and plant protection compositions are as those estimated by the Development Council for Non-ferrous Metals in December 1959. These requirements are estimated to rise from 1000 tons in 1965-66 to 1500 tons by 1970-71.

21. Utensils, Handicrafts & building hardware etc.

A Consumption of copper by utensil manufacturers as estimated by the Development Council for Non-Ferrous Metals (December, 1959) was 11,000 tons in 1958 and was estimated to rise to 15,000 tons in 1960-61 and to 20,000 tons by 1966. In these estimates, however, it is assumed that the allotment of copper for utensil manufacturer will continue to be restricted and the increased demand for this usage will be gradually met by aluminium or subsequently by stainless steel. Estimated requirements of copper for utensils, handicrafts and building hardware has been estimated at about 30,000 tonnes by 1970-71.

ANNEXURE II

Estimate of requirements of copper for Electrical Industries for the year 1965-66.

Consuming Industry/Product	Unit	Production of consuming Industries (1965-66)	Consumption norms. tonnes/ unit.	Requirement of copper (000) 1965-66.
1. Electric motors	th.kw.	1244	1.6	2.0
2. Transformers	th.kva	4500	1.9	8.5
3. Bare copper conductors	tonnes	3100	1.0	3.1
4. PVC & VIR cables	mill. metres	400	29.0	11.6
5. Paper insulated wires and cables	Kilo metres	4000	1.56	6.2
6. Electric fans	th.nos.	1500	1.0	1.5
7. Switchgear and controlgear	Rs.million	60	10.0	0.6
8. Telephone & telegraphic equipment				2.0
9. Refrigerators & Air conditioners	Rs.Million	81	6.0	0.5
			Total	36.0

Estimate of consumption of copper in Electrical Industries for the year 1970-71

Consuming industry/ product	Unit	Target of production of consuming industries(70-71)	Consumption Norms tonnes/unit	Requirement of copper (in 000 tonnes (1970-71)
1. Electric motors including FHP motors, small DC machines & alternators and welding generators.	1000 KW	4400	As per Annexure I	8.3
2. Electric Generators	1000 KW	1500	5.0	7.5
3. Transformers	1000 KVA	11800	As per Annexure I	14.8
4. Switch gear & control gear	Rupees Million	400	10.0	4.0
5. PVC & VIR cables including telephone cables	Million meters	1400	As per Annexure I	13.1
6. Copper conductors for Rly. electrification				4.0
7. Electric fans	1000 Nos.	3500	1.0	3.5
8. Strips for earthing				2.0
9. Refrigerators and air conditioners	Rupees Million	265	6.0	1.6
10. Winding wires and strips for industries other than motors generators, transformers, fans radiators, etc.				7.0
11. Miscellaneous like radios, electronic industries				5.0
				70.8

ANNEXURE IV

Estimate of requirement of copper for Non-electrical Industries for the years 1965-66 and 1970-71.

Consuming industry product	Unit	Consumption norms. tonnes/ units.	Production of consuming products (in 000 tonnes)		Requirement of copper (in 000 tonnes)	
			1965-66	1970- 71	1965-66	1970-71
1. Automobile	Nos.	0.05	72.0	170.0	3.6	8.5
2. Locomotives	Nos.	2.50	0.325	0.462	0.8	1.2
3. Food product Machinery	Tonnes	0.05	32.0	50.0	1.6	2.5
4. Pumps & Compressors	Th.Nos.	4.00	0.225	0.380	0.9	1.5
5. Bolts, nuts, washers etc.	Th.tonnes	20.0	0.1	0.12	2.0	2.4
6. Non-ferrous metal alloys, etc.	Tonnes	0.75	15.0	30.0	11.2	22.4
7. Chemical Industries equipment	Rs.million	10.0	0.08	0.36	0.8	3.6
8. Diesel engines	Th.Nos.	15.0	0.08	0.20	1.2	3.0
9. Metal Powders including pesticides					1.0	1.5
10. Other industries not specified above						14.0
11. Utensils, handicrafts, building hardware etc.						30.0
		TOTAL			41.1	90.6